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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/893,066
Filing Date: June 27, 2001
Appellant(s): WOOD, ROLAND A.

Bradley A. Forest
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 08/09/2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is deficient because the Appellant's disclosure of the dual wavelength focal plane as being composed of two independent arrays, a first array of infrared pixels and a second array of visible light pixels, is confusing and makes one to believe that the dual wavelength focal plane has two independent and separate pixel array levels, but in fact the dual wavelength focal plane has one array of pixels where each pixel is composed of a vertical stacking of an infrared sensing element and a visible light sensing element. As such, the claimed focal plane has only one array of pixels where each pixel has a superposition of an infrared and a visible light sensing element.

(6) *Issues*

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows: The reference Kern et al. (4,296,624) which was introduced in

the last Office Action as evidence and reply to the amendments and arguments made by the Applicant, is also relevant and, as before, will be relied upon.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1-19 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *ClaimsAppealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

6,150,930	COOPER	11-2000
6,320,189	OUVRIER-BUFFET et al.	11-2001
4,296,324	KERN et al.	10-1981

(10) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:
Claims 1-19 are rejected under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cooper (U. S. Patent 6,150,930) and further in view of Ouvrier-Buffet et al. (U. S. Patent 6,320,189).

Cooper discloses an apparatus and method to assist drivers in ascertaining the driving conditions and environment while driving at night and in low visibility conditions.

The device comprises:

- a dual wavelength focal plane detector 34 comprising:
 - o a first array of infrared sensing pixel elements 52 (see Col.4, lines 8-17, and Fig.4a)
 - o a second array of visible light pixel elements 40, 44, 48 responsive to selective colors (red, green and blue) encountered while driving an automobile such that traffic control colors are optimally sensed (see the abstract and Col.2, lines 2-7 and Figs.4a, 5,6).

Regarding claims 1, 7-10, 13, 15-18 Cooper fails to specify that the infrared pixels are bolometer pixel elements and that there is a thermally isolating space between the first and second sensor array. However this constitutes only a matter of design choice because he does not specify nor limit the type of infrared sensor pixels that can be used in his detector, and since he states that any conventionally available silicon based detector will do (see Col.52-64). Thus it would have been obvious to one of ordinary skill in the art to use the conventional pixel arrangement of Ouvrier-Buffet. Ouvrier-Buffet uses bolometer sensor elements 10 as the infrared pixels and a thermally isolating layer 23 that thermally isolates the thermal detection part T of the infrared

bolometers 10 and the photoelectric detection P of the visible sensors 11-12 (see Figs.4, 6 and Col.2, lines 43-68).

Regarding claims 2, 3, 7, 11 the visible pixel elements are selective to the colors red, green and blue respectively, which are the colors aiding in the optimal detection of the traffic control colors. The visible pixel elements 40, 44, 48 are used to sense the selected red, green and blue visible light. The infrared pixel elements 52 are used to sense the infrared radiation incident on the detector pixels.

Regarding claim 4, the detector array is a silicon based detector (CCD), which includes a silicon substrate and silicon photosensor pixels.

Regarding claims 5, 6, 7, the device further comprises filters 39, 47, 43 for selectively passing red, green and blue light to the array of visible light pixel elements 40, 44, 48 (see Col.4, lines 17-31 and Fig.4a).

Regarding claim 9, the device further comprises a heads up display 60 coupled to the detector array 34 for generating a composite image based on the infrared images obtained in the IR video processor 156 and the visible images corresponding to the traffic control colors (red, green, blue) processed in the encoder 58 (see Figs.5, 6).

Regarding claim 10, in operation the device of Cooper is used for providing images on a heads up display 60 for enhancing visibility for night time drivers of vehicles, where the method of obtaining the images displayed on the display 60 comprises:

- sensing infrared radiation incident on the device while driving the vehicle

- sensing selective visible radiation (red, green, blue) corresponding to traffic control colors
- combining the infrared and visible images obtained from sensing the infrared and selective visible radiation to provide a composite image for the display 60 where the traffic control colors are displayed in color (see Col.5, lines 10-68 and Col.6, lines 1-17 and Figs.5, 6).

Regarding claims 8, 12, 13 Cooper, though discloses that commercially available silicon based detectors are used, he fails to specifically describe the arrangement of the infrared and visible pixel arrays, and as such he fails to specify that the infrared pixels are formed above the visible sensing pixels. This limitation, however, constitutes only a matter of design choice since, as clearly shown by Ouvrier-Buffet et al. in Col.2, lines 5-11, the detection of multispectral radiation is conventionally done using detector arrays sensing a first wavelength juxtaposed, adjacent or superimposed on the detector arrays sensing radiation of a second wavelength. As such, a conventional dual wavelength array includes the infrared sensing pixels positioned on top of the visible sensing pixels. Since any conventional detector pixel arrangement is accepted by Cooper, using the arrangement shown by Ouvrier-Buffet would have been obvious to one of ordinary skill in the art at the time the invention was made. Ouvrier-Buffet discloses an IR/visible dual detection array where the visible pixels 11-12 (see Figs.4, 6) are positioned beneath the infrared sensor pixels 10 and thus the arrays are vertically integrated into the monolithic silicon substrate 1. In such an arrangement, the visible light passes through the infrared sensing pixels to arrive at the visible sensors.

Regarding claim 19, Cooper discloses that the infrared image will be displayed on the display 60 in black and white (monochrome) and the visible light images in color (see Col.5, lines 10-22) as well as that various algorithms are used with matrix 56 to obtain the desired composite image. It also uses the system 130 (processor) to select the algorithm for the image based on the colored light signals with information added from the IR signal, as well as that the specific mixing of the color signals will depend upon the vehicle operating environment and the optimum display characteristics desired by the driver (see Col.5, lines 36-49).

Regarding claim 14 Cooper does not specifically disclose amber as one of the selective colors, however, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have amber instead of blue as one of the detected colors since that would be more helpful in identifying all the colors of the traffic light and because Cooper, by disclosing that other types of complimentary filters can be used that pass all visible wavelengths but notch out a particular color, does not limit his invention to detecting only red, green and blue as the selective colors but allows for the detection of other desired colors as well.

(11) Response to Argument

Claims 1-7

The Applicant argues that the reference Cooper does not disclose two separate arrays as part of the dual wavelength focal plane, one array consisting of IR sensing pixels and the other array consisting of visible light sensing pixels, as required by claim

1. The Applicant however misconstrues the claim because, the claim as supported by the disclosure merely discloses a dual wavelength focal plane comprised of an array 210 (underlined for emphasis only) with a plurality of pixels, where each of the pixels comprises a stacking of an IR sensing element and a visible light sensing element. Thus, in effect the claimed dual wavelength focal plane has an array with a plurality of IR and visible light sensing elements positioned in a stacked configuration, but it does not have, as Applicant claims, two independent and separate pixel layers. Also, interpreting the claims only as claimed, we arrive at a focal plane that has one or more IR pixels and one or more visible light pixels positioned either linearly or in a matrix (because an array means either a linear or matrix arrangement of one or more elements). Thus, even without relying on the disclosure interpretation, the reference Cooper does disclose the two arrays of pixels as claimed, because its dual wavelength focal plane 34 includes a plurality of pixels where some pixels are visible light pixels and some are infrared light pixels. The fact that the Cooper focal plane has its plurality of pixels arranged linearly (in one row) instead of a matrix (row and columns) has no bearing on the claiming of an array of pixels. Thus, the array structure as claimed is indeed present in the Cooper reference.

The Applicant also argues that the alternative structure employed by the Applicant does not require the same parts as the system of Cooper. This argument has no patentable weight since only the structures that are claimed in the claims are considered, and thus whether or not the reference has more structural elements than

the present one, unless the Applicant claims inclusively ("consisting of" instead of "comprising"), this limitation does not make a difference as to the scope of the claim.

The Applicant also argues that Cooper does not use microbolometers as the IR pixel elements and that the combination of references of Ouvrier-Buffet and Cooper as used to reject the claims was impermissible because Cooper teaches away from using bolometers and as such the bolometers of Ouvrier-Buffet cannot be substituted into the Cooper system. The Applicant argues that the references cannot be combined because bolometers are not suitable for short IR wavelength detection and short IR wavelength detection is a requirement imposed by Cooper. This argument was addressed in the previous Office Action and it is repeated here. Cooper disclosed that detection in the short IR wavelength range is desired because it allows for a better detection of details when night driving conditions are less than optimal. He discloses that long wavelength detectors are expensive and not as good as short wavelength detectors in detecting lights at night. Also, he cites that there is a need for improved cost effective detection and thus he uses a short wavelength solid-state silicon detector to do so. Thus, first of all, Cooper does not require short wavelength detection but merely states that it is more cost effective to use one. Secondly, even if it did, using the bolometer pixels of Ouvrier-Buffet is justified because: 1) they are commonly known solid state silicon based detectors used for detecting IR radiation and 2) they are cheap; and thus satisfy two of the main requirements and only limitations put on Cooper's detectors and 3) because in fact bolometers are used in short wavelength detection as clearly shown by Kern et al. The fact that Kern et al. uses them in a different setting is no limitation to the fact that

bolometers are used as short wavelength detectors. The argument that they are not efficient has no bearing on whether or not they can be used for detecting short wavelength radiation since Cooper does not ask for efficiency but for cost effectiveness and visibility improvement.

The Applicant also argues that Cooper does not suggest that "traffic colors are optimally sensed", however this limitation has no patentable weight since there is not one single element or method step in the claim to support such functional language (i.e., what exactly makes the sensing optimal?), and since the elements of the claimed focal plane are the same elements as claimed in Cooper in view of Ouvrier-Buffet, and since Cooper aspires for improved light detection, there is nothing to impede the Cooper system from doing the same optimal detection of the lights as claimed.

Claims 8 and 13

The Applicant argues that the limitation that the IR pixel be above the visible pixel is not present because there is no motivation to combine the Ouvrier-Buffet reference with the Cooper reference for the reasons as presented in the arguments to claims 1-7. Since the same argument was presented here as for claims 1-7 the reply as presented above applies equally to claims 8 and 13.

Claims 9, 11, 15-19

The Applicant uses the same arguments as for claims 1-7 and thus the same reply applies here.

Claim 10

The Applicant uses the same arguments as for claims 1-7 and thus the same reply applies here.

Claim 12

The Applicant uses the same arguments as for claims 1-7 and 8, 13 and thus the same reply applies here.

Claim 14

The Applicant argues that the Examiner claimed that having an amber filter is inherently present and because inherency was not established this rejection is flawed. Contrary to this statement, the Examiner did not claim that the amber filter was inherently present in Cooper but stated that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to have amber instead of blue as one of the detected colors since that would be more helpful in identifying all the colors of the traffic light and because Cooper, by disclosing that other types of complimentary filters can be used that pass all visible wavelengths but notch out a particular color, does not limit his invention to detecting only red, green and blue as the selective colors but allows for the detection of other desired colors as well". Since Cooper wants to improve on detecting the colors that one sees while driving, and allows for use of any visible light filters, it is certainly within the skill of an ordinary person in the

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art to know that detecting amber is better than detecting blue when it comes to traffic lights.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

OG
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September 20, 2004

Conferees

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